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What is claimed is:

- 1. An isolated nucleic acid for detection of H. capsulatum comprising:
- (a) SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6; or
 - (b) the complement of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6.
- (c) a fragment of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, or a fragment of the complement of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6 that hybridizes under highly stringent conditions to at least one *H. capsulatum* chitin synthase intron sequence.
- 2. The isolated nucleic acid of claim 1, wherein said fragment comprises at least 8 consecutive nucleotides of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6, or the complement of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6.
- The isolated nucleic acid of claim 1, further comprising an oligonucleotide having the nucleic acid sequence SEQ ID NO: 7 or SEQ ID NO: 8.
 - 4. An isolated nucleic acid for detection of H. capsulatum comprising:
 - (a) the nucleotide sequences set forth in SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, or any complements thereof;
- 25 (b) a nucleotide sequence having at least 70% sequence identity to any one of the sequences in (a); and
 - (c) a fragment of any one of (a) or (b).
 - 5. A method for detecting H. capsulatum in a sample, comprising the steps of:
- 30 (a) providing a sample; and

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 (b)

 synthase that assaying for the presence of DNA comprising a H. capsulatum chitin synthase gene in said sample, wherein the presence of said chitin synthase DNA indicates that the sample contains H. capsulatum.
 - The method of claim 5, wherein the intron 1 of the H. capsulatum chitin synthase
 - The method of claim 5, wherein the sample is obtained from a human.
 - 8. The method of claim 5, further comprising the steps of:
 - 10 exposing the sample under high stringency hybridization conditions to at least one isolated nucleic acid that hybridizes to at least one intron of the H. capsulatum chitin synthase 2 gene; and
 - determining whether there is hybridization of the isolated nucleic acid to (b) the sample, wherein a sample comprising H. capsulatum exhibits detectable hybridization and a sample lacking H. capsulatum does not exhibit hybridization.
 - 9. The method of claim 8, wherein the isolated nucleic acid comprises:
 - the nucleotide sequences set forth in SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6, or any complement thereof;
 - a nucleotide sequence having at least 70% sequence identity to any one of the sequences in (a); and
 - (c) a fragment of any one of (a) or (b).
 - 10. The method of claim 5, further comprising the steps of:
 - 25 conducting polymerase chain reaction (PCR) amplification using at least one nucleic acid primer that hybridizes to at least one intron of the H. capsulatum chitin synthase 2 gene; and
 - (b) determining the presence or absence of the PCR product resulting from said amplification.

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- 11. The method of claim 10, wherein the primers hybridize to intron 1 of the *H. capsulatum* chitin synthase 2 gene.
- 12. The method of claim 10, wherein the primers comprise at least one oligonucleotide having the sequence SEQ ID NO: 7 or SEQ ID NO: 8.
 - 13. A method for detecting an active case of histoplasmosis in a sample, comprising the steps of
 - (a) providing a sample; and
- 10 (b) assaying the sample for the presence of *H. capsulatum* chitin synthase mRNA or any fragment thereof wherein detection of *H. capsulatum* chitin synthase mRNA is associated with an active case of histoplasmosis.
 - 14. The method of claim 13, further including the steps of:
- 15 (a) exposing the sample under high stringency conditions to at least one isolated nucleic acid that hybridizes to *H. capsulatum* chitin synthase mRNA or any fragment thereof; and
 - (b) determining the levels of *H. capsulatum* chitin synthase mRNA based on the amount of hybridization.
 - 15. The method of claim 13, further including the steps of
 - (a) preparing *H. capsulatum* chitin synthase cDNA using mRNA from the sample as a template;
 - (b) conducting PCR using primers that hybridize to the *H. capsulatum* chitin synthase 2 cDNA; and
 - (c) ascertaining the presence or absence of product, wherein detection of the amplification product is associated an active case of histoplasmosis.
- The method of claim 15, wherein the primers comprise at least one oligonucleotide having the sequence SEQ ID NO: 15 or SEQ ID NO: 16.

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- 17. A kit for detection of H. capsulatum comprising:
- (a) one or more containers comprising at least one oligonucleotide primer or DNA probe comprising sequences that hybridize to at least one intron of a *H. capsulatum* chitin synthase gene; and
- 5 (b) at least one separate container comprising *H. capsulatum* DNA comprising chitin synthase intron DNA complementary to said primers.
 - 18. The kit of claim 17, wherein the intron is intron 1 of the chitin synthase 2 gene.
- 19. A method for using molecular genetic techniques to provide a strain of *H. capsulatum* comprising reduced pathogenicity by preparing *H. capsulatum* in which chitin synthase gene expression is either repressed or altered such that production of functional chitin synthase protein is significantly reduced.
- 15 20. The method of claim 19, wherein the chitin synthase gene is placed under control of a repressible promoter.
 - 21. The method of claim 19 wherein chitin synthase gene expression is permanently repressed.
 - 22. The method of claim 19, comprising production of *H. capsulatum* strains comprising a disrupted chitin synthase genomic sequence.
- 23. The method of claim 18, wherein the strain comprising reduced pathogenicity is used to provide a vaccine against *H. capsulatum*.
 - 24. H. capsulatum strains made by the method of claim 18.
- 25. A method for inhibiting *H. capsulatum* chitin synthase production comprising generating a small inhibitory RNA that binds to and prevents expression of the *H. capsulatum* chitin synthase 2 gene and adding said RNA to a cell.

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26. A composition comprising a small inhibitory RNA made by the method of claim 25.

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